

Claims

1. A TFT substrate for an LCD apparatus comprising:
a silicon-containing substrate;
5 a diffusion barrier layer formed on the substrate; and
a copper alloy layer formed on the diffusion barrier layer, the copper alloy layer including a material from about 0.5at% to about 15at%, which is used to form the diffusion barrier layer.
- 10 2. The TFT substrate of claim 1, wherein the diffusion barrier layer comprises a silicide compound including at least one selected from the group consisting of Zr, Ti, Hf, V, Ta, Ni, Cr, Nb, Co, Mn, Mo, W, Rh, Pd and Pt.
- 15 3. The TFT substrate of claim 1, wherein a thickness of the diffusion barrier layer is from about 50Å to about 5000 Å.
4. The TFT substrate of claim 1, wherein the copper alloy layer comprises a metal layer corresponding to a gate line, a source-drain electrode or a data line.
- 20 5. The TFT substrate of claim 1, wherein the silicon-containing substrate is a silicon substrate, a glass substrate or a plastic substrate.
6. A method of manufacturing a TFT substrate for an LCD apparatus comprising:
25 forming a diffusion barrier layer on a silicon-containing substrate;
depositing an alloy including copper and a material from about 0.5at% to about 15at%, which is used to form the diffusion barrier layer, to form a gate wiring

layer;

etching the gate wiring layer to form a gate pattern including a gate line, a gate pad and a gate electrode;

stacking a gate insulating layer;

5 forming a semiconductor layer pattern and an ohmic contact layer pattern;

coating and patterning a data wiring material to form a data wiring having a data line intersecting the gate line, a data pad connected to the data line, a source electrode connected to the data line and adjacent to the gate electrode, and a drain electrode located at a position opposite to the source electrode by interposing the gate electrode therebetween;

10 forming a protecting layer;

patterning the protecting layer and the gate insulating layer to form contact holes through which the gate pad, the data pad and the drain electrode are exposed;

stacking a transparent conductive layer; and

15 etching the transparent conductive layer to form an auxiliary gate pad, an auxiliary data pad and a pixel connected to the gate pad, data pad and drain electrode, respectively.

7. The method of claim 6, wherein forming the diffusion barrier layer
20 comprises:

depositing at least one compound including a material selected from the group consisting of Zr, Ti, Hf, V, Ta, Ni, Cr, Nb, Co, Mn, Mo, W, Rh, Pd and Pt, to a thickness from about 50Å to about 5,000Å; and

25 converting the deposited compound into a silicide compound by a heat-treatment process.

8. The method of claim 7, wherein the heat-treatment process is a

deposition treatment process that stacks the gate insulating layer.

9. The method of claim 7, wherein the heat-treatment process is performed at a temperature from about 200°C to about 500°C under a vacuum, an
5 air or an N₂ atmosphere.

10. A method of manufacturing a TFT substrate for an LCD apparatus comprising:

forming a diffusion barrier layer on a substrate;

10 depositing an alloy including copper and a material from about 0.5at% to about 15at%, which is used to form the diffusion barrier layer, to form a gate wiring layer;

etching the gate wiring layer to form a gate pattern including a gate line, a gate pad and a gate electrode;

15 stacking a gate insulating layer;

stacking a semiconductor layer, an ohmic contact layer and a conductive layer;

forming a photoresist pattern having a first portion, a second portion thicker than the first portion and a third portion thinner than the first portion;

20 forming a data wiring, an ohmic contact layer pattern and a semiconductor layer pattern by the photoresist pattern, the data wiring including a data line, a data pad connected to the data line, a source electrode and a drain electrode;

forming a protecting layer;

25 patterning the protecting layer and the gate insulating layer to form contact holes through which the gate pad, the data pad and the drain electrode are opened;

stacking a transparent conductive layer; and

etching the transparent conductive layer to form an auxiliary gate pad

connected to the gate pad, an auxiliary data pad connected to the data pad and a pixel electrode connected to the drain electrode.

11. The method of claim 10, wherein the diffusion barrier layer
5 comprising:

depositing at least one compound including a material selected from the group consisting of Zr, Ti, Hf, V, Ta, Ni, Cr, Nb, Co, Mn, Mo, W, Rh, Pd and Pt, to a thickness from about 50Å to about 5,000Å; and

10 converting the deposited compound into a silicide compound by a heat-treatment process.

12. The method of claim 11, wherein the heat-treatment process is a deposition treatment process that deposits subsequent gate insulating layer.

15 13. The method of claim 11, wherein the heat-treatment process is performed at a temperature from about 200°C to about 500°C under a vacuum, an air or an N₂ atmosphere.

20 14. The method of claim 10, wherein the first portion is disposed between the source electrode and the drain electrode, the second portion is disposed on the data wiring.

15. A method of manufacturing a TFT substrate for an LCD apparatus comprising:

25 forming a diffusion barrier layer on an insulating substrate;

depositing an alloy including copper and a material from about 0.5at% to about 15at%, which is used to form the diffusion barrier layer, to form a data wiring;

forming a red color filter, a green color filter and a blue color filter on the substrate;

depositing a buffer material to form a buffer layer covering the data wiring and the color filters;

5 forming a gate wiring layer on the buffer layer;

etching the gate wiring layer to form a gate wiring including a gate line and a gate electrode;

forming a gate insulating layer covering the gate wiring;

10 forming an ohmic contact layer of an island shape formed on the gate insulating layer, a semiconductor layer pattern formed on the gate insulating layer and a first contact hole through which a portion of the data line is exposed to the gate insulating layer and the buffer layer;

15 etching the transparent conductive material covering the ohmic contact pattern of an island shape to form a source electrode, a drain electrode separated from the source electrode and formed on a layer substantially identical to the source electrode and a pixel wiring including a pixel electrode connected to the drain electrode; and

20 removing an exposed portion of the ohmic contact layer pattern disposed between the source electrode and the drain electrode to divide the ohmic contact layer pattern into two parts.

16. The method of claim 15, wherein the forming the diffusion barrier layer comprises

25 depositing at least one compound including a material selected from the group consisting of Zr, Ti, Hf, V, Ta, Ni, Cr, Nb, Co, Mn, Mo, W, Rh, Pd and Pt, to a thickness from about 50Å to 5,000Å; and

converting the deposited compound into a silicide compound by

heat-treatment process.